

APPENDIX H  
MODELED ATTAINMENT TEST  
SAN ANTONIO EAC REGION ATTAINMENT DEMONSTRATION  
MARCH 2004



## Appendix H

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## MODELED ATTAINMENT TEST METHODOLOGY

The modeled attainment test for the SAER was conducted by completing a series of steps that are described in EPA's *Draft Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS*. These steps require identifying the "current period" to use in the attainment test, calculating the current site-specific design value, calculating the daily relative reduction factor, and calculating the future site-specific design values. The 2007 modeled data listed in the following tables are the predicted averages from the base case.

### Current Period

To determine the current period to use in an attainment test, EPA guidance suggests reviewing monitored data for the three-year period straddling the year represented by the most recently available emissions inventory and the three-year period that is anticipated to be used to designate the area nonattainment. For the SAER, the most recently available emissions inventory is for the year 1999. Therefore, ozone measurements for the three-year period between 1998 – 2000 represented one data set used in the analysis. The three-year period anticipated for nonattainment designations is 2001 – 2003. The current monitored design values are selected based on the higher of the two estimates at each monitor.

### Current Site-Specific Design Values

The current site-specific design value was calculated at each monitor by identifying the fourth highest concentration in each of three consecutive years and determining the mean (average) of the three year's data. The design values were computed for both three-year periods, 1998-2000 and 2001-2003. Table H-1 provides the current design value by monitor for the 1998-2000 period. Likewise, table H-2 lists design values for the years 2001-2003. The highest design values, by monitor, when comparing the two tables are highlighted in yellow.

Table H-1. Design Values at Monitors during Three-year Period Straddling the Most Recent EI (1999).

Monitoring Site	4 <sup>th</sup> High 8-hr Daily Max. 1998	4 <sup>th</sup> High 8-hr Daily Max. 1999	4 <sup>th</sup> High 8-hr Daily Max. 2000	Average 4 <sup>th</sup> High 8-hr Daily Max.
CAMS 23 *	89 ppb	91 ppb	77 ppb	85.67 = 85 ppb
CAMS 58 **	87 ppb	87 ppb	80 ppb	84.67 = 84 ppb
CAMS 59 ***	76 ppb	81 ppb	82 ppb	79.67 = 79 ppb
CAMS 678 ****		84 ppb	70 ppb	77 ppb

\*At San Antonio Northwest CAMS 23 (Marshall High School), the 1998 fourth-highest reading was 89 ppb (excusing May 7, 1998 as a smoke day, which had a value of 93 ppb).

\*\*Camp Bullis CAMS 58 went online August 12, 1998

\*\*\*Calaveras Lake CAMS 59 went online May 14, 1998

\*\*\*\*CPS/Trinity Pecan Valley CAMS 678 went online March 11, 1999

Table H-2. Design Values at Monitors during Three-year Period Anticipated for Nonattainment Designation (2001 – 2003).

Monitoring Site	4 <sup>th</sup> High 8-hr Daily Max. 2001	4 <sup>th</sup> High 8-hr Daily Max. 2002	4 <sup>th</sup> High 8-hr Daily Max. 2003	Average 4 <sup>th</sup> High 8-hr Daily Max.
CAMS 23	78 ppb	104 ppb	86 ppb	89.33 = 89 ppb
CAMS 58	81 ppb	95 ppb	85 ppb	87 ppb
CAMS 59	78 ppb	81 ppb	76 ppb	78.33 = 78 ppb
CAMS 678	72 ppb	80 ppb	76 ppb	76 ppb

76 ppb

### Relative Reduction Factor

The modeled attainment test also requires the calculation of a daily relative reduction factor (RRF). The RRF is the ratio of the *future* 8-hour daily maximum concentration predicted near a monitor to the *current* 8-hour daily maximum concentration predicted near a monitor. Using the results of the most recent model, Run 18 Base Case G, the relative reduction factors were calculated for each monitor using the formula shown below.

$$(RRF) = (\text{mean peak 8-hr daily max})_{\text{future}} / (\text{mean peak 8hr daily max})_{\text{current}}$$

Since the photochemical model uses a 4-km grid system, the area near a monitor was defined as the 7x7 array of grid cells surrounding the monitor. The predicted future and current 8-hour daily maximum concentrations are listed in table H-3. Also, Table H-3 lists the daily RRF for each SAER monitor.

Table H3: San Antonio 2007 Relative Reduction Factors.

Site	Ozone Concentrations (ppb) of 1999 Base Case					
	9/15/1999	9/16/1999	9/17/1999	9/18/1999	9/19/1999	9/20/1999
CAMS 23	81.15	78.08	81.35	98.57	101.45	93.22
CAMS 58	75.59	77.26	81.99	98.57	101.88	91.32
CAMS 59	66.90	72.41	69.88	72.12	81.83	86.27
CAMS 678	70.17	71.54	69.88	79.63	91.55	87.66

Site	Ozone Concentrations (ppb) of 2007 Control Strategy Case					
	9/15/1999	9/16/1999	9/17/1999	9/18/1999	9/19/1999	9/20/1999
CAMS 23	79.15	74.91	79.18	88.12	92.01	90.58
CAMS 58	73.55	74.16	78.21	88.12	92.01	88.47
CAMS 59	63.93	65.97	67.79	68.88	76.94	82.57
CAMS 678	69.75	67.87	68.72	75.98	85.19	87.18

Site	Relative Reduction Factors					
	9/15/1999	9/16/1999	9/17/1999	9/18/1999	9/19/1999	9/20/1999
CAMS 23	0.98	0.96	0.97	0.89	0.91	0.97
CAMS 58	0.97	0.96	0.95	0.89	0.90	0.97
CAMS 59		0.91		0.96	0.94	0.96
CAMS 678	0.99	0.95		0.95	0.93	0.99

## MODELED ATTAINMENT TEST RESULTS AFTER INCLUSION OF LOCAL CLEAN AIR STRATEGY IMPLEMENTATION

The local SAER air quality planners, elected officials, and citizens have chosen to implement local control strategies to assure this attainment result. As described in appendix K, three strategies have been chosen. The single locally-implemented clean air strategy, Stage I vapor recovery, is creditable, enforceable, and permanent in the terms required for credit taken in the SIP.

- Stage I vapor recovery for service stations of 25,000 gallons throughput of gasoline or more per month will be implemented and operational no later than December 31, 2005.

In addition, Transportation Emission Reduction Measures (TERMs) and Transportation Demand Management (TDM), which can be quantified as SIP creditable reductions, were included in the control strategy run as recommended by TCEQ. The quantity of reductions available for existing, ongoing, and programmed TERMS and TDMs were calculated and included in the attainment demonstration of San Antonio's proposed revisions to the State Implementation Plan. The benefits of the TERM and TDM reductions accrue as additional evidence that the San Antonio region will reach attainment. See Appendix K, Analysis of Additional Evidence, for this discussion.

Adopted in December 2002, state Senate Bill 5 established the Texas Emission Reduction Plan (TERP), which provides incentives, rebates, and grants for various types of clean air projects and requires the adoption of energy efficiency / renewable energy projects by political subdivisions of the State. These requirements are ongoing in Texas and highly effective in the San Antonio region. For example, the diesel-retrofit projects in the San Antonio region are conservatively estimated to reduce NOx by 2 TPD in 2007. The control strategy run accounts for emission reductions anticipated for energy efficiency / renewable energy and other TERP projects in the region. These reduction benefits represent additional evidence that the San Antonio region will reach attainment. With the completion of the work accomplished through a partnership described in Appendix K, Analysis of Additional Evidence, the San Antonio regional air quality planners took credit for these controls in the regional SIP revision.

The attainment test was calculated based on results of modeling Stage I vapor recovery, TERMS, TERP energy efficiency and other projects, and TDMs in the 4-county SAER. Table H-4 provides the future design values when the impact of these controls is taken into account.

### Future Site-Specific Design Values

The future site-specific design values were calculated using the formula:

$$(DVF)_i = (RRF)_i (DVC)_i$$

where

$(DVC)_i$  = the current design value at monitoring site I

$(RRF)_i$  = the relative reduction calculated near site I (averaged over several days)

$(DVF)_i$  = the estimated future design value for the time attainment is required (averaged over the same several days)

Table H-4 lists the results of calculating a future design value for each monitoring site. Although EPA guidance allows for truncation of decimals when calculating future design values, these results are also listed to two decimal places. The attainment test is passed when the future design value at each monitor is  $\leq 84$  ppb. As shown, the attainment test was passed for all SAER monitors.

Table H-4. Attainment Test Results at SAER Monitors with Control Strategies.

Site	1998-2000	2001-2003	RRF Mean	Raw 2007 Design Value	Truncated 2007 Design Value	Pass / Fail Status
CAMS 23	85	<b>89</b>	0.95	84.27	84	Pass
CAMS 58	84	<b>87</b>	0.94	81.96	81	Pass
CAMS 59	<b>79</b>	78	0.94	74.33	74	Pass
CAMS 678	<b>77</b>	76	0.96	74.26	74	Pass

In addition, should lower Reid Vapor Pressure to 7.2 pounds per square inch be available during the coming ozone seasons through negotiations which are ongoing at the time of this document submission (late March 2004), SIP credit will be taken for this program also. See Appendix K, Analysis of Additional Evidence, for this discussion.